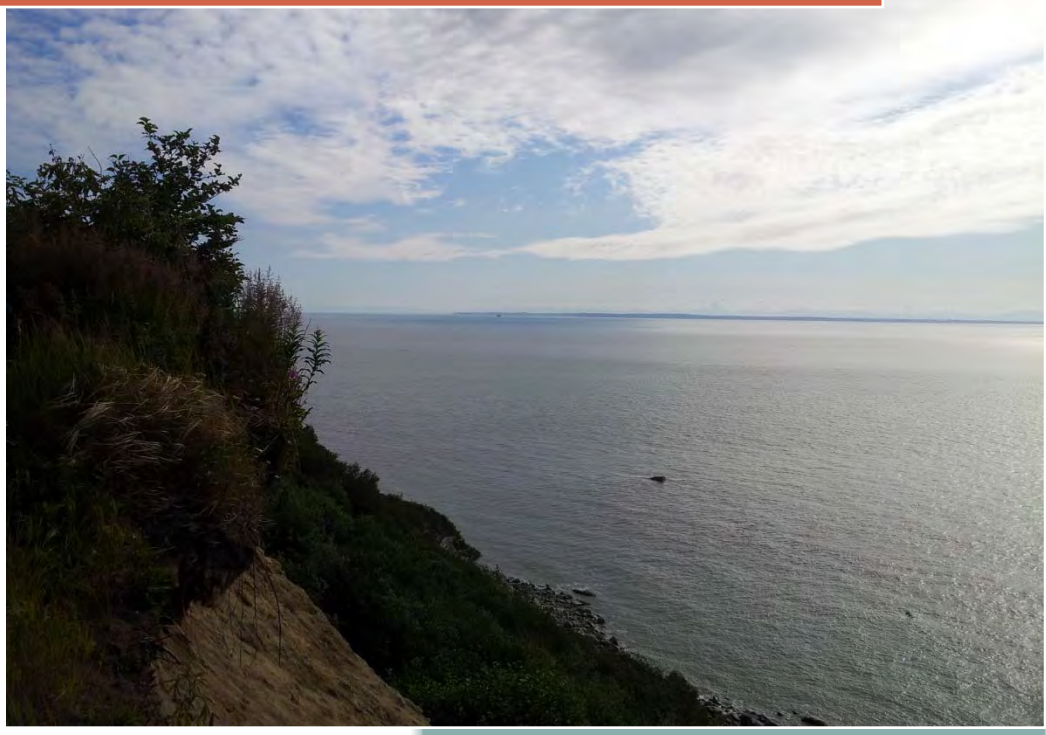
2013

Trans-Foreland Pipeline Project

Project Description and Figures



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Appendix A Figures

Acronyms and Abbreviations

ADEC	Alaska Department of Environmental Conservation
ASME	American Society of Mechanical Engineers
CFR	Code of Federal Regulations
CIE	Cook Inlet Energy
CIPL	Cook Inlet Pipeline
CISPRI	Cook Inlet Spill Protection and Response, Inc.
CO-OPS	Center for Operational Oceanographic Products and Services
dB	decibels
DOT&PF	Department of Transportation and Public Facilities
ESA	Endangered Species Act
FBE	fusion-bonded epoxy
HDD	Horizontal Directional Drill
KPB	Kenai Peninsula Borough
KPL	Kenai Pipeline Company
MLLW	Mean Lower Low Water
N	North
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
psig	pounds per square inch gage
ROW	Right-of-Way
Sec	Section
SWAPA	Southwest Alaska Pilots Association
T	Township
TFPL	Trans-Foreland Pipeline
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
W	West

1.0 Description of Project

The Trans-Foreland Pipeline (TFPL) Project is proposing to construct an 8-inch diameter sales crude oil pipeline from its existing Kustatan Production Facility on the west side of Cook Inlet to the Kenai Pipeline Company (KPL) Tank Farm on the east side of the inlet. Portions of the pipeline will be installed on the seafloor of Cook Inlet. Figures 1 through 7 in Appendix A show the project area, pipeline alignment, and proposed pipeline corridors and seismic map. The new pipeline will allow Cook Inlet producers to bypass the current Drift River infrastructure on the west side of Cook Inlet; therefore, reducing transfers of oil between the shore and barges and the associated barge traffic across the inlet to the KPL dock.

1.1 Land Ownership

Cook Inlet Energy (CIE) owns the land on the west side of Cook Inlet where the Kustatan Production Facility is located. Salamatof Native Association owns a portion of the Kustatan pipeline right-of-way (ROW), and CIE holds a ROW for the access road and pipeline corridor. CIE holds a State Non-exclusive ROW and a Fiber Optic Cable ROW at the Horizontal Direction Drill (HDD) location from the top of the bluff to seafloor exit site. The State of Alaska owns Cook Inlet. Kenai Peninsula Borough (KPB) owns the proposed HDD site in Nikiski. The Kenai Spur Highway ROW is owned by the State of Alaska, Department of Transportation and Public Facilities (DOT&PF). Tesoro owns the KPL Tank Farm. Figure 1 through 5 show the project area and land ownership.

1.2 Kustatan

The 8-inch pipeline will begin at the Kustatan Production Facility, travel approximately 1.9 miles mostly in uplands along an existing pipeline ROW to the bluff on the west side of Cook Inlet (Figure 2). The pipeline trench measures approximately 1.9 miles (10,032 feet) long by 3 feet wide by 4 feet deep. An existing access road parallels the pipeline corridor and will be used to access the site. Three pipelines and a fiber optic cable are currently buried in this ROW.

1.3 West Shore Transition

Starting at the top of bluff, the pipeline will be installed using HDD for approximately 0.3 miles (1,584 feet) into Cook Inlet where it will exit onto the seafloor (Figure 2). The entry site for the HDD installation on the bluff is in uplands and will measure 30 feet long by 100 feet wide. The seafloor exit site will measure approximately 14 inches (1.2 feet) in diameter or approximately 0.00002 acres and is located at approximately -4 feet mean lower low water (MLLW). Portions of the pipeline will be installed parallel to three existing pipelines that connect to the Osprey platform 5 miles offshore.

1.4 Cook Inlet

From the HDD exit site, the pipeline will be laid on the seafloor across Cook Inlet in a horseshoe shape using a lay barge, tugs and other support vessels. The subsea pipeline will be buried and anchored where possible to provide stability. The subsea pipeline is laid in a horseshoe shape to facilitate construction in the high tidal currents occurring between the East and West Forelands. The forelands represent the narrowest part of Cook Inlet and have high currents and a deep trench. The route was also selected to minimize tidal stresses on the pipeline and avoid water depths greater than 200 feet, the maximum depth for safe operation by marine divers. The pipeline route does not cross any seismic faults (Figure 6).

The length of the sea floor portion of the pipeline is approximately 22 miles (116,160 feet). The sea floor portion of the pipeline will cover a total area of approximately 2.8 acres (Figure 1).

1.5 East Shore Transition

HDD will be used to install the pipeline from an existing gravel pit (KPB-owned Pole Island parcel) under the bluff for approximately 0.5 miles (2,640 feet) into Cook Inlet where it will exit onto the seafloor at approximately -30 feet MLLW (Figure 3). The entry site for the HDD installation is located in uplands and will measure 200 feet long by 100 feet wide. The seafloor exit site will measure approximately 14 inches (1.2 feet) in diameter or approximately 0.00002 acres.

1.6 Nikiski

From the HDD entry site at the KPB-owned Pole Island parcel, the pipeline will travel north along the west side of the Kenai Spur Highway in an existing utility and pipeline corridor. The pipeline turns west and enters the southeast corner of the KPL tank farm and terminates at an existing pipeline header where a pigging receiver and metering skid will be installed. The trench measures approximately 4.2 miles (22,176 feet) long by 3 feet wide by 4 feet deep. Multiple pipelines and other utilities are currently buried in the State of Alaska, DOT&PF Kenai Spur Highway ROW (Figure 4 and Figure 5).

Portions of the KPB-owned Pole Island parcel will be graded to remove the mounded gravel and pole to provide a level surface. Additional structural fill may be added as support under the HDD rig. The HDD will be installed using a drill rig. Once the HDD section of pipeline is complete, a block valve and underground valve vault measuring approximately 8 feet wide by 8 feet long will be installed along the pipeline east of the HDD entry point. The locking vault will be installed flush to the ground. The area south of the pipeline (approximately 1-acre) will be used for staging of equipment and supplies to support HDD and pipeline construction (Figure 7).

The pipeline will be completely buried on the Pole Island parcel and along the Kenai Spur Road. The Pole Island parcel will be fenced. HDD installation and pipeline construction will take place between February and October 2014. Equipment and materials staged on the Pole Island parcel include a 65,000 pound HDD rig, rack of augers, portable generators, 10,000 gallon clean water tank, 8 pickup trucks, 2 flatbed trucks, 1 side boom, 1 stringing truck, 1 ½ yard track hoe, and approximately 100 pieces of 80 feet long, 8-inch diameter pipe. In addition, the drilling mud recycling and cooling equipment, and drilling mud tanks for cuttings will be staged at the site. The drilling mud tanks will be used to dispose of cutting, and when full will be removed and disposed at an off-site, permitted grind and inject facility.

After construction, all equipment and supplies will be removed from the site. The valve vault and pipeline will be inspected twice monthly.

2.0 Location

The proposed route is located on private, KPB, and State of Alaska submerged lands and DOT&PF ROW. The location information includes latitude and longitude; State parcel identification numbers; subdivision descriptions; and meridian, township, range and section numbers.

2.1 Latitude and Longitude

Northern Boundary: 60° 51’ 34.833” N

Southern Boundary: 60° 30’ 0.626” N

Eastern Boundary: 151°10’ 14.343”W

Western Boundary: 151° 58’ 34.059” W

2.2 State Parcel Identification

Kustatan:

22104024 – Salamatof Native Association, Inc.

22104042 – Cook Inlet Energy, LLC

22104006 – Cook Inlet Energy, LLC

Nikiski:

01402005 – Kenai Pipeline Company

01726067 – Kenai Peninsula Borough

2.3 Subdivision Properties

Kustatan:

22104006 - Cook Inlet Energy LLC; AN 0004527 US Survey 4527 Lot 1

22104042 - Cook Inlet Energy LLC; AN 0012121 US SURVEY 12121 LOT 2

22104024 - Salamatof Native Association, Inc. AN & SECS 4 5 9 & 10 TR A EXCL US Surveys & Nat Allotments

Nikiski:

01402005 – Kenai Pipeline Company; PTN GL 1 W of N Kenai Rd; & PTN GL6 EXCL PTN DESC In Deed 39/134; & PTN TR 1 USS 1095 (HES 74) As Shown on K-672 EXCL THAT PTN DESC in deed 53/99

01726067 – Kenai Peninsula Borough; 0830146 Pole Island Sub Tract C-1

2.4 Shore Fishery Lease Case Numbers

ADL 224785

ADL 224786

2.5 Right of Way Easements

DOT&PF Design and Construction ROW Central Region; ADL 26123

Kodiak-Kenai Cable Company LLC; ADL 228146

2.6 Non Exclusive Right of Way Easements

Cook Inlet Energy, LLC; ADL 227954

2.7 Meridian, Township, Range, Section

Seward Meridian

Township (T) 7 North (N), Range (R) 14 West (W), Sections (Sec.) 4, 9, 10, 11, 14, 23, 26, 35

T6N, R14W – Cook Inlet

T6N, R13W – Cook Inlet

T6N, R12W, Sec. 02, 03, 07, 08, 09, 10, 11, 18

T7N, R12W, Sec. 21, 22, 27, 34

3.0 Cook Inlet

3.1 Bathymetry and Seafloor Hazards

To assist in pipeline construction planning, high-resolution bathymetric data was collected in the vicinity of the proposed pipeline corridor by TFPL contractors in 2011. Additional high-resolution bathymetry was collected in August 2012 in the Nikiski area, north of the docks. In summer 2013, additional bathymetry and a seafloor hazard survey will be conducted for the entire sub-sea pipeline route.

3.2 Tidal Currents

Tidal current data were obtained from the National Oceanic and Atmospheric Administration (NOAA) Center for Operational Oceanographic Products and Services (CO-OPS) from current meters deployed in the Cook Inlet project area. The meters were used to record velocities and phases of the strongest currents for future tidal current predictions. Using the 2011 Tidal Current Predictions available from NOAA, a data set with maximum predicted current velocities was assembled for Cook Inlet in the Nikiski area for 16 tidal current stations. An emphasis was placed on maximum velocities occurring during the lay barge season at the sea surface and near the sea floor. Cook Inlet currents in the vicinity of the forelands are not as strong in May and June when most of the seafloor pipeline construction will occur. Following a review of the mapped tidal velocities, a pipeline alignment was selected that met both lay barge capabilities and sea floor depth constraints. Lay barges were assumed to have a 4-knot maximum operating cross-current limit based on information received from numerous construction companies.

3.3 Sea Floor Pipeline Location

The Southwest Alaska Pilots Association (SWAPA) provided input to the location of the subsea pipeline. TFPL consulted with SWAPA and the United States Coast Guard (USCG) to determine the necessary setback distances from the Nikiski docks and construction timing. The pipeline was relocated 5.3 miles south of the original proposed alignment on the east side of Cook Inlet and 2.3 miles south of the southernmost Nikiski dock to address safety concerns voiced by SWAPA and to eliminate interference with docking procedures.

4.0 Construction Method and Schedule

4.1 Subsea Construction Method and Timing

The pipeline will be welded on the lay barge deck and placed in the water using a stinger. The stinger is a lattice truss system used to support the pipeline as it is laid off the barge (Photo 1). Where conditions allow, the pipeline may be buried using a subsea trenching jet sled to provide on-bottom stability. The jet sled may be used to install the pipeline in the seabed where soils are conducive to burial. The jets and pipeline system are mounted on the jet sled and is towed along the pipeline by a cable from the pipe lay barge. A built in high-pressure water jet opens a trench in the seabed underneath the pipeline after it has been laid on the seafloor. The jet sled straddles the pipeline. The seabed material is loosened by the jets, entrained by suction tubes, and expelled behind the sled covering pipeline as it moves. The lay barge provides the pressurized water and air for the system.

Where soils are not conducive to pipeline burial, anchors may be used to support the pipeline. Anchors may be placed periodically along the pipeline's length as necessary to provide support and stability. Marine divers will install the anchors. Hydraulic hoses, located on the deck of the barge, are connected to a gear box and underwater installation frame. The hydraulics are used to turn the anchor. Divers will inspect the pipeline route and determine the necessity and frequency of anchors.

Approaching the Nikiski shoreline, the subsea pipeline will cross an existing fiber optic cable. The fiber cable is buried in sediments at the location shown on Figure 1. The pipeline will cross over the fiber optic cable. The cable location will be determined by a subsea hazard survey. During construction, concrete mats or sandbags stabilized with cement will be laid across the cable area. The pipeline will be installed over top of the cable area with additional bags or mats used to hold the pipeline in place (Photo 2).

Subsea pipeline construction is scheduled to begin May 1 and be completed by September 30, 2014. Most of the in water construction work will be completed in May and June. The in-water timing was selected based on lowest annual tidal velocities and U.S. Fish and Wildlife Service (USFWS) comments. Construction in Cook Inlet will begin on the east side of the alignment and will be completed before the end of June to avoid interference with commercial drift and set net fisheries. In water construction will occur outside the timeframe when the area is considered critical habitat for Cook Inlet beluga whales.

Photo 1: Example Lay Barge with Stinger

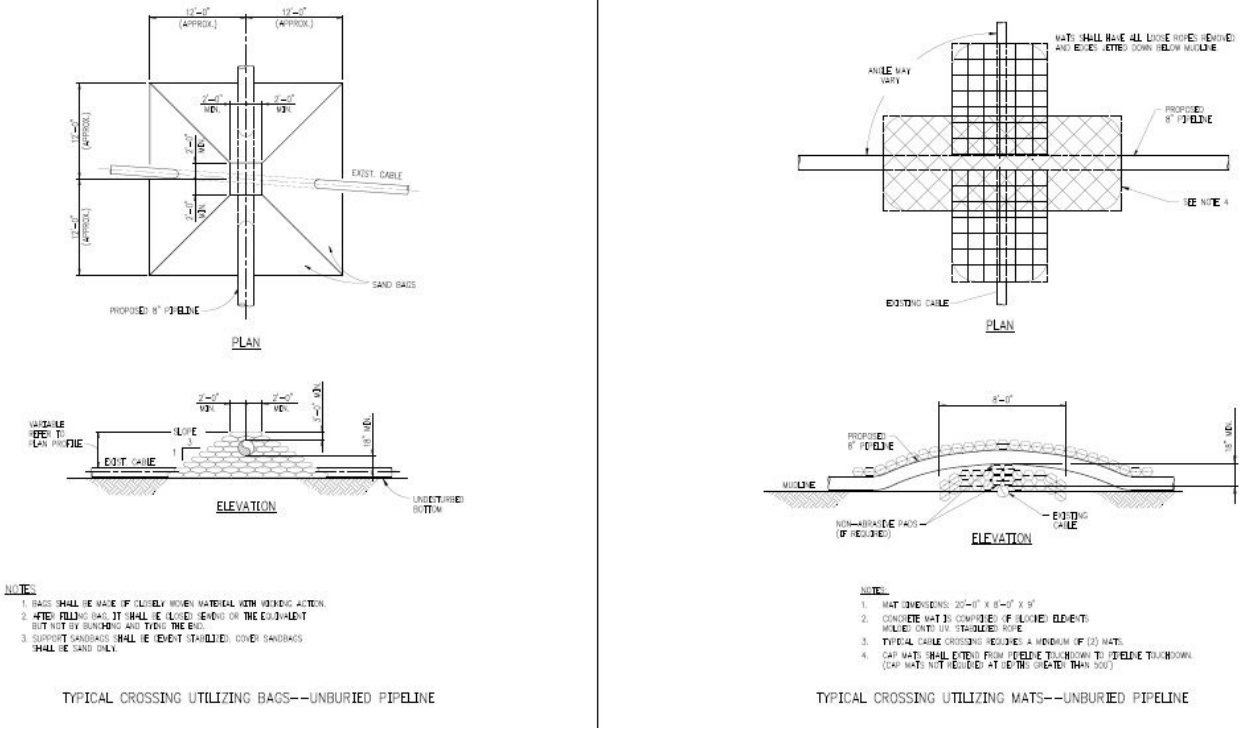

Photo 2: Fiber Optic Cable Crossing Designs

4.2 Onshore Construction

The buried portions of the pipeline will be installed using the cut and cover construction method. The trench will be excavated using a backhoe. Overburden will be stockpiled along the length of the trench. Two stockpiles will be created with the topsoil segregated to preserve the native seed bank. Wetlands outside of the pipeline excavation area will be flagged and avoided. For construction through wetland areas, overburden will be stockpiled on adjacent uplands, and the backhoe will be operated from either the adjacent road at Kustatan or from an existing trail or on construction matting at Nikiski.

Once the pipeline is laid, the overburden will be used as backfill in the trench. The segregated topsoil will be placed on top of the trench and mounded to account for settlement. The disturbed area will be fertilized to facilitate growth of the native seeds preserved within the topsoil. Existing roads paralleling the pipeline corridor will be used to access the site.

4.3 Horizontal Directional Drilling (HDD)

The pipeline will be installed using HDD at the Kustatan Point and Nikiski transitions from the onshore pipeline to the offshore pipeline. HDD is a steerable, trenchless method of installing underground pipelines. The HDD will be installed in an arc along the prescribed bore path using a land-based, surface-launched drill rig. A pilot hole is drilled using locating devices and an electronically controlled guidance system to steer the drill bit along a pre-determined path to the exit location. After drilling the pilot hole, successive reaming passes are made to enlarge the drill hole to the desired diameter. The assembled pipeline is then pulled back through the reamed borehole. The HDD will exit the seafloor at approximately -4 MLLW at Kustatan and -30 feet MLLW at Nikiski and will be timed to coincide with low tide so the site will be dry. Once installed, the offshore pipeline will be welded to the HDD transition pipeline segment. The HDD segment will be picked up by the lay barge and welded to the offshore pipeline on the deck of the barge. Land-based welders will connect the HDD segment to the onshore pipeline. Drilling muds and cuttings will be recovered and disposed at existing, permitted grind and inject facilities at Kustatan and Nikiski.

4.4 Staging Areas

An existing pad at the Kustatan Production Facility will be used to stage construction equipment and supplies on the west side of Cook Inlet. On the east side of the inlet, an existing pad at the KPL Tank Farm and KPB's Pole Island will be used to stage construction equipment and supplies. No materials will be staged on the beach or along the pipeline ROW. All staging areas are located in uplands. The KPL and Kustatan staging areas will measure approximately 250 feet long by 500 feet wide (2.9 acres). The staging area at KPB's Pole Island parcel is approximately 1-acre.

4.5 Material Sites

On the west side of Cook Inlet, the existing, permitted 1.5-mile gravel pit will be used for sand and gravel as needed to supplement material removed from the trench for construction. On the east side of Cook Inlet, an existing commercial operation will be contracted to provide sand and gravel as needed.

4.6 Construction Schedule

Construction of the pipeline is scheduled for February through October 2014. Clearing of the necessary portions of the Kustatan ROW will take place in the late fall 2013. The seafloor portion of the pipeline will be laid in May and September 2014 and will avoid conflicts with commercial and set net fishing.

Construction of the onshore portion of the pipeline will occur between February and October 2014. The HDD will be installed prior to the seafloor pipeline between February and June 2014. Hydrostatic testing will occur immediately after installation.

4.7 Construction Personnel

Construction personnel will be hired locally to the greatest extent practical. Others will be billeted at existing commercial facilities or housed at the existing camp at West McArthur River or on the barge. No temporary construction camps will be necessary.

5.0 Environmental Considerations

5.1 Project Purpose

The new pipeline is needed to bypass the existing Cook Inlet Pipeline (CIPL) infrastructure on the west side of Cook Inlet in order to eliminate the business interruption risk of volcanic activity and ice movements to oil shipments through the Drift River Terminal, to reduce transportation expenses, and to reduce oil tanker traffic between Drift River and KPL dock. The purpose of a project is to install an 8-inch sales crude oil pipeline between Kustatan Point and Nikiski. Currently sales crude oil on the west side of Cook Inlet moves through a series of pipelines to the Drift River tank farm. The oil is then loaded onto barges and transported across the inlet to the KPL dock in Nikiski. The oil is offloaded from the barge and into tanks at the refinery. Because the Drift River Oil Terminal is located near the foot of Mt. Redoubt, an active volcano, there have been major interruptions to oil movements during periods of volcanic activity.

5.2 Alternatives

Two alternatives, the Northern and Southern routes, were studied for the project. The Northern Route alternative begins at the Kustatan Production Facility, travels along the north side of the existing Kustatan Road to a HDD entry point on the bluff, crosses Cook Inlet to the tidelands adjacent to Hedberg Drive in Nikiski (Figure 8). The pipeline follows the Hedberg Drive utility ROW east to Kenai Spur Road then turns south to the KPL Tank Farm. The Cook Inlet portion of the Northern Route is 26 miles in length.

Table 1: Northern Route - Dismissed

Wetland/Water of U.S. Location	Linear Feet	Acres	Cubic Yards
Kustatan Wetland	1,788	0.12	795
Nikiski Intertidal Zone	430	0.03	191
Nikiski Wetland	172	0.01	76
Combined Total	**2,390**	**0.16**	**1,062**
Cook Inlet*	**68,640**	**4.75**	**30,500***

*Estimate burial of approximately ½ of the subsea pipeline; trench dimensions: nominally 3 feet wide by 4 feet deep

SWAPA originally requested the project avoid the Nikiski dock area by 1 mile. Subsequent coordination with SWAPA and USCG noted the 1 mile radius around the Nikiski docks may not be sufficient if there is an emergency and anchors are dropped to slow a vessel.

To avoid impacts to anchoring procedures at the Nikiski docks and to ship traffic and commercial fishing vessels, coordination with SWAPA and USCG were used to determine the optimum seafloor pipeline route and construction timing. Also during design, engineering concerns about the pipeline burial through the tidelands at Nikiski prompted exploration of an HDD option.

The Southern Route was developed to address impacts and concerns raised about the Northern Route. The Southern Route was located to avoid impacts to the anchoring procedures at the Nikiski docks. From the Kustatan Production Facility, the pipeline travels along the south side of the Kustatan Road to an HDD entry point on the bluff, crosses under the tidelands, and exits on the seafloor of Cook Inlet. After crossing the inlet, the pipeline is installed using HDD under the Nikiski tideland and the bluff. At the top of the bluff, the pipeline exits at the KPB Pole Island Gravel Pit and turns north. The pipeline is buried on the west side of the Kenai Spur Road in the existing DOT&PF utility ROW and turns west in to the KPL tank farm (Figure 1). The Cook Inlet portion of the Southern Route is 22 miles in length.

Table 2: Southern Route – Build Alternative

Wetland/Water of U.S. Location	Linear Feet	Acres	Cubic Yards
Kustatan Wetland	476	0.03	212
Nikiski Wetland	141	0.01	62
Combined Total	**617**	**0.04**	**274**
Cook Inlet*	**58,080**	**4.0**	**25,800**

*Estimate burial of approximately ½ of the subsea; trench dimensions: nominally 3 feet wide by 4 feet deep

The Northern Route was dismissed because of greater impacts to wetlands and waters of the U.S. and potential interference with docking procedures at the Nikiski docks.

The Southern Route is carried forward as the Build Alternative.

5.3 Avoidance

The pipeline has been rerouted to the south of the Nikiski docks, and the pipeline will be partially buried in Cook Inlet to avoid impacts to the pipeline and to ship traffic docking at Nikiski. Portions of the pipeline may be buried using a jet sled where soils allow. When rocky bottom is encountered, the pipeline will be laid on the top of the sea floor, and anchors may support the pipeline. Noise levels of construction equipment do not exceed the underwater noise threshold of 120 dB set by NMFS.

The project avoids impacts to the tidelands on the east and west side of Cook Inlet by using HDD to install the pipeline from the bluff to the seafloor of Cook Inlet. The exit site of the HDD will not be wetted during low tide when the seafloor penetration will occurs.

Construction timing will allow the project to avoid impacts to a large volume of ship traffic transiting the area, commercial fishing vessels, set netters, and Cook Inlet beluga whales. The pipeline was re-routed to avoid impacts to ship traffic docking at Nikiski.

According to USFWS, Steller's eiders (*Polysticta stelleri*) occur in Cook Inlet south of the project area on the east side of Cook Inlet between Clam Gulch and Ninilchik about 35 miles south of Nikiski (2012). They could be present between October and April. Subsea pipeline construction will be conducted after May 1 to avoid disturbance to Steller's eiders.

5.4 Minimization

The Southern Route (0.04 acres) minimizes impacts to wetlands over the Northern Route (0.16 acres) by 75 percent. The Southern Route (22 miles) shortens the distance across Cook Inlet by 4 miles over the Northern Route (26 miles).

The project is designed to minimize impacts to wetlands by using existing disturbed road ROW utility corridors to route the pipeline.

Operation of the TFPL will reduce barge traffic between Drift River and Nikiski. Data compiled by Etkin (2001) and others indicate pipelines present much lower risk of spill than tanker transport.

5.5 Cultural Resources

A cultural resource assessment was conducted for the TFPL Kustatan corridor. The 2013 Trans-Foreland Pipeline Project Preliminary Cultural Resource Assessment (Pipkin 2013) will be provided to the State Historic Preservation Office to facilitate Section 106 consultations. Examination of the maritime cultural resources in the Cook Inlet project area shows no shipwrecks or areas of concern in the vicinity of the pipeline alignment.

5.6 Wetlands

Wetland delineation for the Kustatan corridor was conducted in May 2013. The survey area included a 50-foot wide corridor adjacent to the south side of the Kustatan access road along the pipeline alignment. The results are recorded in the Wetlands Delineation Report (Jacobs Engineering Group 2013) for West Foreland. The survey identified three wetland types in the project area: palustrine emergent (1.8 acres), palustrine scrub-shrub palustrine emergent (0.5 acres), and palustrine forested (0.9 acres) (Jacobs 2013a). Hydrology is altered by the existing adjacent road. The pipeline installation would temporarily disturb approximately 0.03 acres of wetlands.

The Nikiski pipeline corridor crosses one small disturbed wetland. The wetland is disturbed from previously buried pipelines and other utilities. Hydrology in the project area is altered by the existing Kenai Spur Highway. The pipeline installation would temporarily disturb 0.01 acres of wetlands (Jacobs 2013b).

5.7 Noise

The underwater noise impact level for beluga whales is 120 dB continuous or 160 dB impulse. Underwater noise associated with construction will include the use of tugs, support boats, and a pipeline lay barge during in-water construction. Tug boats will position the lay barge and its anchor array. Two local oil spill response vessels (ORSV), OSRV Endeavor and M/V Perseverance will also

provide project support. Construction crews intend to work 24 hours a day. Vessels will run between 12 and 18 hours a day. Two tug boats with 4500-horsepower motors will likely run for 16 hours a day, and be idle for 8 hours a day. At idle, the sound level at the engines of the tug boats is 80 decibels (dB). While running, the sound level at the engine is 100 dB. The lay barge does not have engines for propulsion. Sound levels were collected from the deck of the tug boat; underwater noise levels are not available for these specific vessels (Posik 2013). No underwater noise levels are available for the OSRV Endeavor or M/V Perseverance.

The sub-sea trenching jet sled used during construction operates with high-pressure water jets (Photo 3). The lay barge provides the pressurized water and air for the system. No motors or compressors are located on the underwater jet sled. The motor is located on the deck of the lay barge. The noise level on deck of the lay barge to run the motor is 115 dB. The jet sled will run approximately 15 hours a day for about 20 days (Posik 2013). Anchors will be installed by marine divers (Photo 4). Hydraulic hoses, located on the deck of the barge, are connected to a gear box and underwater installation frame. Hydraulics are used to turn the anchor during installation. The 70 gallon per minute hydraulic power pack has a sound level of 98 dB while, and the twin-drive hydraulic motor sound level is 84 dB while running (Wahrenberger 2013). No motors or compressors are located in the water. Because sound dissipates with distance and the motors would not directly contact the water, underwater the sound levels would be lower than 120 dB sustained.

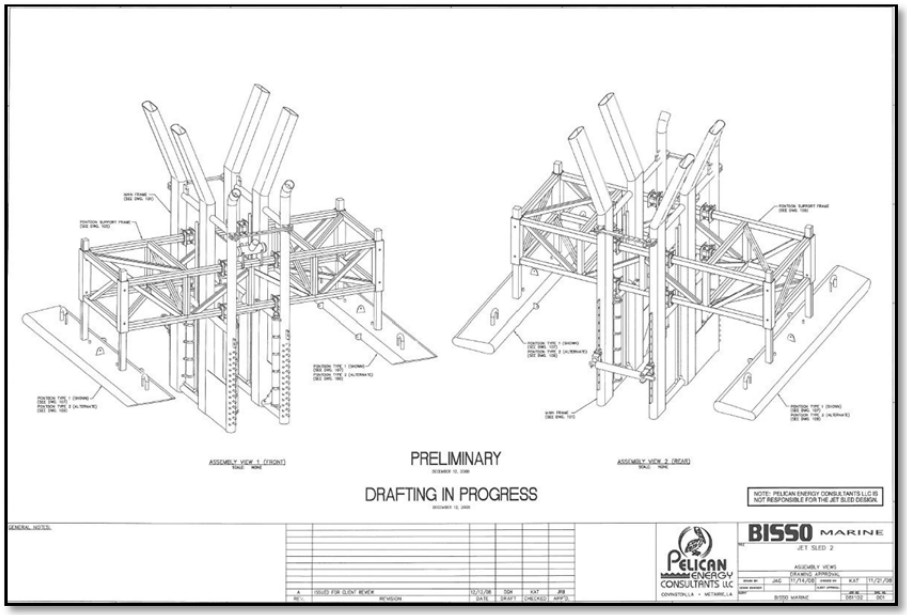

Photo 3: Jet Sled Schematic

Photo 4: Anchor Installation Example

All noise associated with pipeline construction will be short term and localized. Cook Inlet has some of the most extreme tidal fluctuations in North America. Tides are an important natural factor and contributor to ambient sound levels. Ambient noise levels previously measured in Cook Inlet near Knik Arm range from 120 to 130 dB (Port of Anchorage 2007). Blackwell and Greene (2003) reported background noise levels at Point Possession and Elmendorf Air Force Base as 120 dB. At Point MacKenzie, Blackwell measured background noise levels as 115-133 dB (Blackwell 2004). Sound dissipates with distance from the source, and few, if any, beluga whales are expected to be in the area during the in-water construction window. Therefore, in-water construction and operation noise may affect, but will not likely to adversely affect beluga whales.

5.8 Marine Mammals

According to the National Marine Fisheries Service (NMFS), the Cook Inlet beluga whales (*Delphinapterus leucas*) and the Steller sea lion (*Eumetopias jubatus*) are the only Endangered Species Act (ESA)-listed marine mammal species of concern. Both may be present seasonally near the Kenai River. The project area is located in the fall and winter designated critical habitat area for Cook Inlet beluga whales (NOAA 2011). Beluga whales are not expected to be in the area during the summer construction window. The project area is designated as Cook Inlet beluga whale Critical Habitat Area 2 - fall and winter feeding and transit area. Typically belugas are found in shallow coastal waters, but do make deeper dives to feed (NMFS 2009). Belugas concentrate in upper Cook Inlet at rivers and bays beginning in later April or early May and target several fish species. Primary prey species of the beluga whale include Pacific salmon, eulachon, and cod; walleye Pollock; saffon cod and yellowfin sole. Belugas do not always feed at streams with the highest run of fish, but appear to take advantage of shallow bathymetry. Belugas are seen less frequently at the mouth of the Kenai River despite high salmon returns (NMFS 2009). The mouth of the Kenai River is approximately 6.8 miles from the pipeline shore transition at Nikiski.

Steller sea lions do not regularly use the project area and are not expected in the area at the time of pipeline installation (Mahoney 2013).The project area is not designated as critical habitat for the Steller

sea lion; critical habitat is defined as 20 nautical miles around all major haul-outs and rookeries and large offshore foraging areas (NMFS 2013).

According to USFWS, "northern sea otters (*Enhydra lutris kenyoni*) occupy near shore marine habitat along the southwestern portion of Cook Inlet, and near shore marine areas from Redoubt Point south are designated as critical habitat (2012)." The northern sea otter are not expected in the project area.

Non-ESA marine mammal species includes harbor seals (*Phoca vitulina*), harbor porpoise (*Phocoena phocoena*), and transient killer whales (*Orcinus orca*). Harbor seals are present the in project area, but no haul outs have been noted at the Nikiski HDD exit location between April and June, and few haul outs were noted at the Kustatan HDD exit location (Boveng et al 2011). Because of the distance from shore of the HDD exit locations, project construction will not likely affect harbor seals. Threats to marine mammals include shipping and ship strikes, oil spill exposure, and habitat degradation. Pipeline design, construction timing, and engineering and administrative controls are used to eliminate and mitigate potential impacts to beluga whales and other marine species. Construction and operation of the TFPL may affect, but will not likely adversely affect marine mammals including the Cook Inlet beluga whale.

Construction timing will be used to avoid the fall and winter designated critical habitat use times by beluga whales. The in-water work will occur during summer months when belugas are unlikely to be present and before the start of the commercial and set net fisheries season.

Oil spills are a concern from current petroleum shipping practices and from a subsea pipeline. Operation of the TFPL will reduce the transfer of oil by barge across Cook Inlet from the Drift River terminal to the KPL facility. Pipeline routing, design, protection, testing, planning and response are all used avoid and minimize impacts from an oil spill (Section 6).

Noise is limited to vessel operations and motors operating on the deck of the lay barge. None of the sound levels from deck compressors and motors exceed the 115 dB (Bisso 2013, Pinnacle 2013). Continuous noise from tug engines will not exceed 100 dB while underway an 80 dB while idle (Bisso 2013). Sound levels associated with pipeline construction will be less than 120 dB continuous, and noise will be short-term and localized. Support boats will be contracted through Cook Inlet Spill Protection and Response, Inc. (CISPRI). Sound levels for the OSRV Endeavor or M/V Perseverance support vessels are unknown. These vessels routinely operate in Cook Inlet. No noise is associated with pipeline operation.

Construction Noise Levels

Equipment	Equipment Location	Sound level (dB) Idle	Sound Level (dB) Running
Tug Engines (4,500 hp)*		80	100
Jet Sled Motor	On Barge Deck	--	115
Hydraulic Power Pack	On Barge Deck	--	98
Twin Drive Hydraulic Motor	On Barge Deck	--	84

*Sound levels collected on deck. Underwater sound levels not recorded.

In-water sound levels were recorded by the Port of Anchorage for northern Cook Inlet. The Port of Anchorage noise study reported sound levels of tugs pulling barges between 135 and 160 dB (2007).

Installation of the pipeline at the HDD exit sites on the east and west sides of Cook Inlet will occur during low tide when the areas are not wetted. No construction activities will occur on the beaches. In shallow waters, the pipeline may be buried to avoid contact with marine vessel nets and anchors. During the two month in-water construction window, vessels traffic will increase in the project area. However, tug boats will operate at slow speeds and move in straight lines while positioning the lay barge and anchor array and are not expected to pose a ship strike threat to belugas and other marine mammals.

In-water construction occurring at depths of less than -30 feet MLLW is expected to take less than 2 weeks.

Pipeline burial is expected to increase turbidity along the route as sediments are entrained by the suction tubes and expelled behind the jet sled. Turbidity levels are expected to return to normal ambient levels within four hours. Some sediment will be dispersed by tidal currents (Williams 2013). Impacts from turbidity will be short-term and localized.

No fish or marine mammal pathways will be blocked during pipeline construction or operations.

6.0 Pipeline Design and Safety

6.1 Pipeline Design

The design life of the Tran-Foreland Pipeline is 30 years. A design life does not indicate the pipeline and associated structure will be used up, failure-prone, or require replacement after 30 years. For this project, the 30-year design life assumes the systems, components, and structures will perform their primary functions with acceptable safety, regulatory, and environmental performance, and will not experience large failures, require extensive replacements, or need significant repairs. The pipeline is designed in accordance with all Federal and State regulations, and accepted industry standards. The governing codes of the TFPL design and operating parameters are 49 Code of Federal Regulations (CFR) 195 and American Society of Mechanical Engineers (ASME) B31.4. Geology, soils, seismic hazards and faults, tsunamis, temperature, and water and seafloor characteristics are considered during pipeline design. The project area is free of permafrost. The TFPL is being designed to withstand the pressure and forces of the Cook Inlet tidal currents, wind waves, ice, scour, and physical obstacles that may contact the pipe.

Bank erosion was also considered during design of the HDD entry points. Historic aerial photographs were compared to current photos, and the rate of bank loss was calculated to predict the estimated bank loss over the design life. The estimated bank loss was accounted for during the selection of the HDD entry point locations.

The pipe wall thickness is 0.5 inches with a corrosion allowance of 0.125 inches. The material grade and type is API 5L, Grade X52 seamless pipe with a minimum yield of 52,000 pounds per square inch and a maximum operating pressure of 2,220 pounds per square inch gage (psig). Initial flow conditions are estimated at a pressure of 500 psig, and maximum flow conditions will not exceed 2,100 psig.

A fusion-bonded epoxy (FBE) anti-corrosion coating will be applied to the pipeline. The total minimum thickness for the coating will be 25 mils. The FBE field joint coating will be compatible with the factory-applied anti-corrosion coating.

6.2 Pressure and Leak Tests

During pipeline construction, all welds will be radiographically or ultrasonically examined prior to laying the pipe on the seafloor. Once construction is complete, hydrostatic testing will occur before the pipeline is placed into service. Hydrostatic testing of the pipeline will be conducted in accordance with 49 CFR 195 and ASME B31.4. The pipeline will tested to a minimum of 125 percent of the design pressure for a minimum of 4 hours. An additional 4 hour leak test will be conducted following the pressure test.

Water for the hydrostatic test will be withdrawn from Jazlyn Lake adjacent to the Kustatan Production Facility. Existing Temporary Water Use Permit A2012-01 (expires April 2017) for water withdrawal has sufficient volume permitted to conduct the hydrostatic test of the entire pipeline. On the Nikiski side, a tanker truck will provide water to test the HDD. Water used during the tests will be discharged to uplands under Alaska Wastewater General Permit 2009DB0004.

6.3 Cathodic Protection and Leak Detection

The TFPLs cathodic protection system includes the protective FBE coatings and corrosion protection. Cathodic protection considers the annual variations in soil resistivity due to seasonal frost. External corrosion will be controlled in accordance with federal regulations. Conductive connections to the pipeline will be strictly controlled. An isolation system will be installed to control stray electric currents in the pipeline and facility piping systems. The isolation system will increase the cathodic protection system effectiveness and confine or eliminate electrolytic corrosion.

Leak detection is monitored by several methods including high and low alarm pressure transducers. A pressure increase or decrease of 20 percent or more of the normal operating pressure will shut down the pumping operations immediately. The pipeline will be equipped with metering tests, and manual and automatic emergency shutdown systems. Pipeline inspection occurs twice daily.

Pipeline valves will be inspected every 7.5 months and at least twice each calendar year to verify proper operation. An annual inspection of the cathodic protection system is performed by personnel onsite. This inspection is then reviewed by third-party contractors.

The pipeline is smart pig capable. The smart pig system allows for the in-line inspection and maintenance and cleaning of the pipeline. Smart pig tools are used to detect pipeline deformities, settlement, internal and external corrosion, and cracking. Smart pig inspections validate the effectiveness of the cathodic protection system and detect potential problems in advance of an incident or failure. All records of inspections are maintained for at least 5 years.

6.4 Oil Spill Prevention

Prior to TFPL construction and operation, numerous plan approvals are required to prevent oil spills, detect leaks, and ensure proper maintenance and surveillance occurs over the life of the pipeline. The Alaska Department of Environmental Conservation (ADEC) requires approval of a Non-Tank Vessel Plan for the tugs and lay barge. USCG requires an approved Vessel Response Plan. Prior to pipeline operations, ADEC must approve a Blowout Contingency Plan and Oil Discharge Prevention and Contingency Plan (C-Plan). The C-Plan dictates requirements and standards, and defines required practices for leak detection, cathodic protection, anchoring, pipeline size and material, pipeline cleaning and inspection, and reporting.

6.5 Oil Spill Response

CISPRI is the primary spill response contractor in Cook Inlet. CISPRI is a USCG certified Oil Spill Removal Organization (OSRO) and State of Alaska certified Primary Response Action Contractor. CISPRI will mobilize personnel and equipment in the first hours of a spill event. Assets include off-shore response vessels and containments booms, rope skimmers and disk simmers. Disk skimmers have 85 percent collection efficiency. Aircraft can be launched to track the edges of a spill and document efficiency of recovery. If needed, they can mobilize contract fishing vessels. CISPRI response resources are located throughout Cook Inlet, and their main response facility, fleet, and inventory are located at Nikiski. CISPRI has mutual air agreements with other Alaska OSROs to supplement their capabilities and provide shoreline assessments, wildlife response, waste management and disposal (CISPRI 2009).

CISPRI has rigorous inspection and maintenance programs, and all response vessels meet USCG requirements. In case of an offshore spill, the priority is to eliminate the source, and contain and mechanically recover the spill. Primary containment, control strategies, and cleanup techniques include entrapment, diversionary booming and passive collection. All spill response equipment is inspected weekly. Oil spill response measures include fire prevention and control, and discharge tracking (CISPRI 2009).

Oil spill response capabilities include appropriate measures to protect plants, wildlife and culturally sensitive areas. CISPRI's plan to minimize impacts include hazing wildlife away from spilled oil and response operations, capturing and transporting affected wildlife to treatment facilities, rehabilitation and release, and recovery of dead wildlife. Their wildlife task force includes vessels and appropriately trained wildlife responders (CISPRI 2009).

The National Preparedness for Response Exercise Program is used to coordinate CISPRI's oil spill response training and drill requirements. Appropriate training is provided to all response personnel, and training records are maintained for a period of 5 years. Training records are available for agency inspection. Oil spill response drills and exercises include emergency notification and equipment deployment. Unannounced drills and spill management team tabletop exercises are also conducted. Every three years, an exercise is conducted to test the entire response plan (CISPRI 2009).

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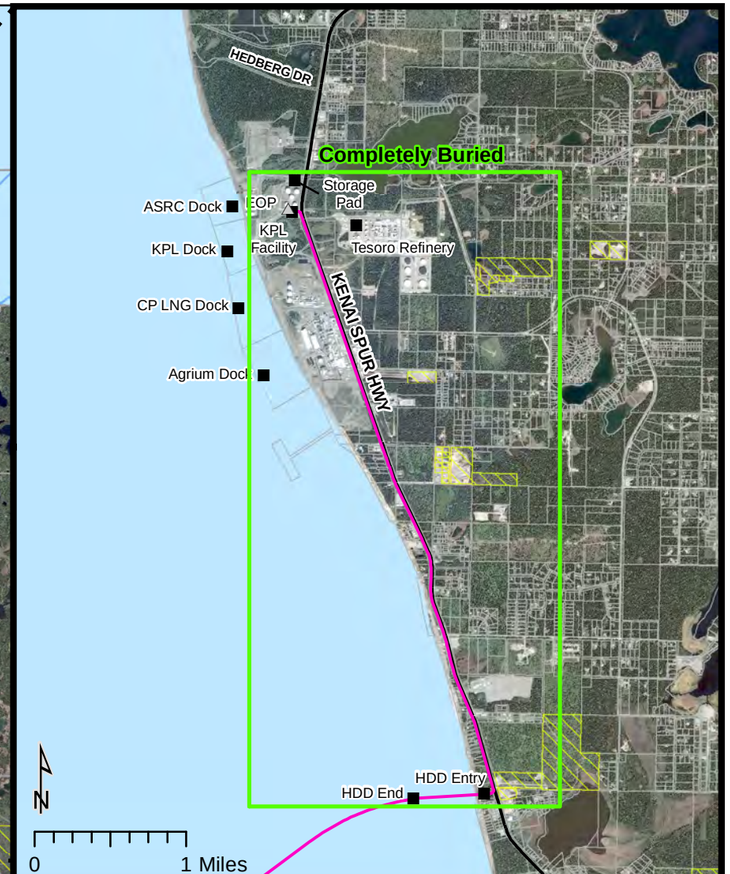
Appendix A Figures



Cook Inlet
State of Alaska

Kustatan River

Kustatan

Osprey Platform

Nikiski

Kenai River

Partially Buried

T 9N
T 8N
T 6N
T 5N
T 5N
T 4N

R 15 W R 14 W
R 14 W R 13 W
R 13 W R 12 W
R 12 W R 11 W

Cook Inlet Energy

Legend

- Beginning and End of Pipeline
- Point of Interest
- Cook Inlet Sales Crude Pipeline
- Fiber Optic Cable
- Parcel
- KKCC Cable Easement
- Material Site

Note: Bathymetry contour interval is 50 feet

N

0 1.5 3 Miles

Baker

Trans-Foreland Pipeline Project - Overview

DATE: 8/16/2013	SCALE: 1 in = 3 miles	CHKD APPVD KB	
DRAWING: CIE_Vicinity_11x17_revB.mxd	Figure 1	REV: B	

COOK INLET ENERGY LLC

T 7N R 14W SEC 3 & 4 SEWARD MERIDIAN
AN 0012121 US SURVEY 12121 LOT 2

Kustatan Production Facility

Storage Pad

BOP

SEC 4
T7N R14W
SM

SEC 3
T7N R14W
SM

SEC 2
T7N R14W
SM

SEC 5
T7N R14W
SM

COOK INLET ENERGY LLC

Cook Inlet

SEC 8
T7N R14W
SM

SALAMATOF NATIVE ASSN INC

SEC 10
T7N R14W
SM

HDD Entry

Cook Inlet Energy, LLC - Fiber Optic Cable Right of Way

SEC 11
T7N R14W
SM

HDD End

Cook Inlet Energy, LLC Non-Exclusive Right of Way

Shore Fishery Lease
ADL 221918

SEC 9
T7N R14W
SM

NATIVE ALLOTMENT NO. A-056458

Shore Fishery Lease
ADL 221918

Cook Inlet Energy

Legend

- Beginning of Pipeline
- Point of Interest
- Cook Inlet Sales Crude Pipeline
- Wetland
- Material Site
- Shore Fishery Lease
- Pipeline Corridor
- Non Exclusive ROW
- Fiber Optic Cable ROW

Parcels

- Native
- Private
- State

N

0 375 750 1,500 Feet

Baker

Trans-Foreland Pipeline Project
Kustatan Corridor

DATE:	SCALE:	CHKD APPVD
8/5/2013	1 in = 750 feet	KB

DRAWING: Kustatan_11x17_revB.mxd

Figure 2

REV: B

MHW

ASRC Dock

KPL Dock

CP LNG Dock

Agrium Dock

EOP

KPL Facility

Tesoro Refinery

KENAI SPUR HWY

Cook Inlet

T 7 N
T 6 N

HDD End

HDD Entry

KPB
Pole Island

5

4

Legend

- EOP
- Point of Interest
- *Cook Inlet Sales Crude Pipeline*
- Index

N

0 0.25 0.5 Miles

Cook Inlet Energy

Baker

Trans-Foreland Pipeline Project
Nikiski Corridor

DATE:	SCALE:	CHKD APPVD:
8/5/2013	1 in = 0.5 miles	KB

DRAWING: Nikiski_Wetlands_Index_11x17_revB.mxd Figure 3 REV: B

KENAI SPUR HWY

ADOT Right of Way

28 27 26 25

33 34 35 36

T 7 N
T 6 N

4 3 2 1

9 10 11 12

15 14 13

Cook Inlet

663

23472

23617

4124

Shore Fishery Lease ADL 224786

HDD Entry

HDD End

Shore Fishery Lease ADL 224785

KPB Pole Island

2

Legend

Contaminated Sites
- Cleanup Complete
- Cleanup Complete - Institutional Controls

- End of Pipeline
- Point of Interest
- Cook Inlet Sales Crude Pipeline
- Pipeline Corridor

- Shore Fishery Lease
- Tidelands Lease
- Wetland
- Material Site

Parcels
- Borough
- Federal
- Municipal
- Native
- Private
- State

N

Miles

0 0.1 0.2

Cook Inlet Energy

Baker

Trans-Foreland Pipeline Project
Nikiski Corridor

DATE:	SCALE:	CHKD APPVD:
10/4/2013	1 in = 0.25 miles	KB

DRAWING: Nikiski_Wetlands_11x17_revB.mxd

Figure 4

REV: B

Shore Fishery Lease ADL 52976

KENAI SPUR HWY

ASRC Dock

KPL Facility

EOP

KPL Dock

CP LNG Dock

Agrium Dock

Tesoro Refinery

ADOT Right of Way

Cook Inlet

313 25878 1009 24735 3034 23436 4606 1837 4305 1510 1841 2802 2430 1509 3190 23294 314 3932 1528 312 122 1008 2424 124 465 25171 1534

17 16 15 14 20 21 22 23 29 28 27 26 32 33 34 35 4 3 2

T 7 N
T 6 N

Legend

Contaminated Sites
- Active
- Cleanup Complete
- Cleanup Complete - Institutional Controls

- End of Pipeline
- Point of Interest
- Cook Inlet Sales Crude Pipeline
- Pipeline Corridor
- Shore Fishery Lease
- Tidelands Lease
- Material Site

Parcels
- Borough
- Federal
- Municipal
- Native
- Private
- State

N

Miles
0 0.1 0.2

Cook Inlet Energy

Baker

Trans-Foreland Pipeline Project
Nikiski Corridor

DATE:	SCALE:	CHKD APPVD:
10/4/2013	1 in = 0.25 miles	KB

DRAWING:		REV:
Nikiski_Wetlands_11x17_revB.mxd	Figure 5	B

Capps Glacier fault
Castle Mountain Fault
Lake Clark Fault
Lake Clark Fault
Lake Clark Fault
Lake Clark Fault
Bruin Bay Fault
Bruin Bay Fault
Bruin Bay Fault
Border Ranges Fault
Border Ranges Fault
Trading Bay
Cook Inlet
Knik Arm
Turnagain Arm
Proposed Cook Inlet Energy Pipeline

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Cook Inlet Energy

Legend

Fault

Cook Inlet Sales Crude Pipeline

N

0 2.5 5 10 Miles

Baker

Trans-Foreland Pipeline Project - Faults

DATE:	SCALE:	CHKD APPVD
08/02/2013	1 in = 10 miles	KB

DRAWING: CookInlet_Seismicity_11x17_revB.mxd

Figure 6

REV: D

Legend

- Point of Interest
- Fence
- Cook Inlet Sales Crude Pipeline
- Parcels
- Staging Area
- Pad
- Valve Vault

N

Feet

0 50 100

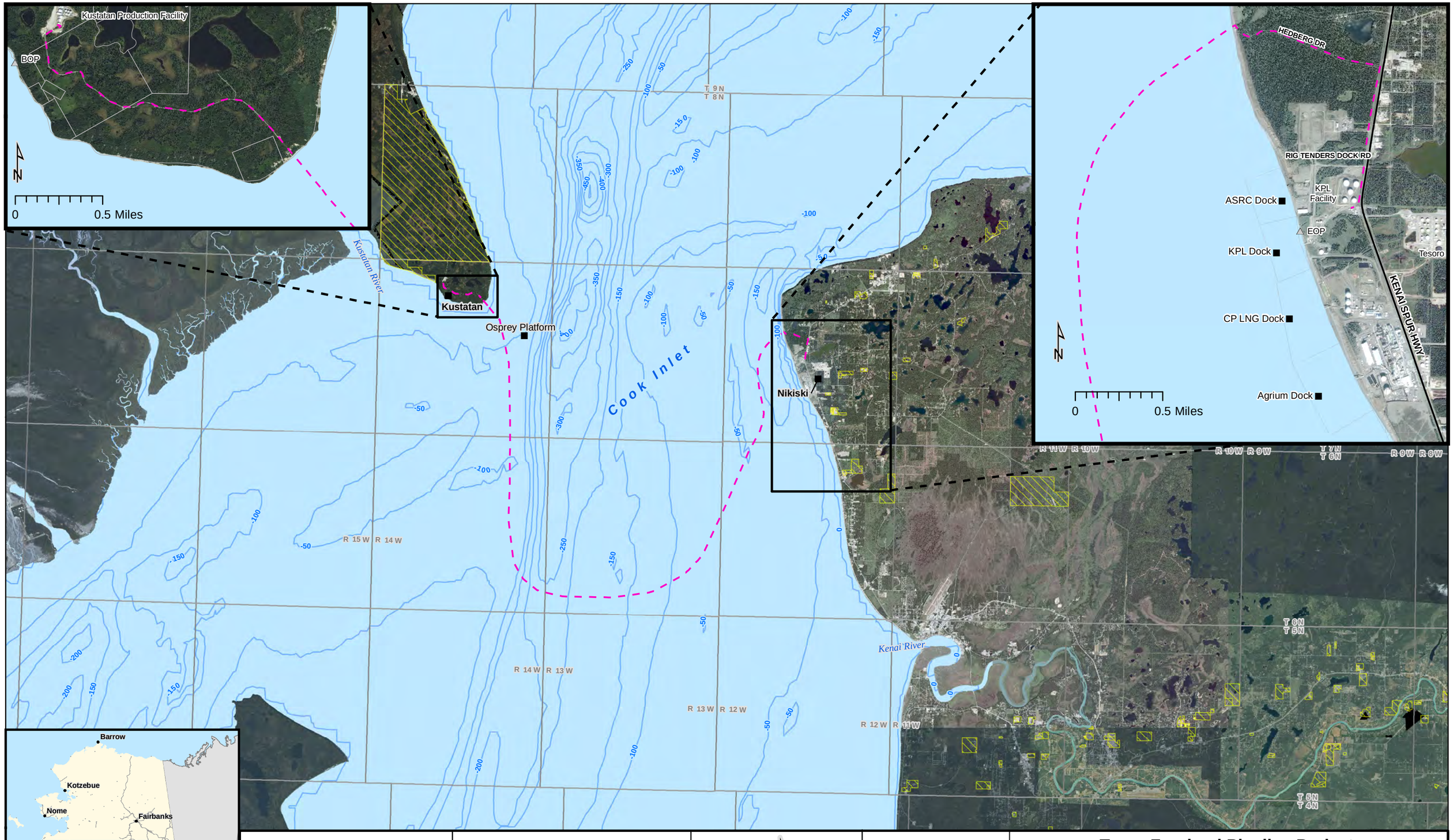
Cook Inlet Energy

Baker

Trans-Foreland Pipeline Project Staging Area

DATE:	SCALE:	CHKD APPVD:
8/14/2013	1 in = 200 feet	KB

DRAWING: Polei_Island_8X11_revA.mxd Figure 7 REV: A



Cook Inlet Energy

Legend

- Beginning and End of Pipeline
- Point of Interest
- Dismissed Alternative
- Parcels
- Material Site

Note: Bathymetry contour interval is 50 feet

N

0 1.5 3 Miles

Baker

Trans-Foreland Pipeline Project
Dismissed Alternative

DATE: 8/14/2013	SCALE: 1 in = 3 miles	CHKD APPVD KB	
DRAWING: CIE_Dismissed_Alt_11x17_revB.mxd	Figure 8	REV: B	